Introduction of a Trauma Assessment Tool into the Emergency Department of Calmette Hospital

Phnom Penh, Kingdom of Cambodia

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Introduction:

Present day Cambodia is a country that is still recovering from its tragic political history. It is a land of extreme darkness and light. Years of civil war have left permanent markers of past conflicts: fields of undetonated landmines claim victims daily in this blighted land, poverty is rampant, and post war psychological trauma lingers but is rarely discussed.

Yet despite the hardships incurred since the Khmer Rouge initiated their "Year Zero" on April 17, 1975 the country has slowly begun to open up to the world outside. Indeed, Cambodia's complicated history and socioeconomic challenges make it a unique place to study issues in international health and emergency medicine.

Background of Project:

Cambodia has a population of approximately 13.8 million residents divided amongst twenty-four provinces. Its capital, Phnom Penh, has approximately 1.3 million residents of which 48% are male and 52% are female[1].

While Cambodia's health care system suffers from a burden of infectious diseases (namely tuberculosis, malaria, and HIV), trauma was one of the top five leading causes of mortality in Cambodia in 2005. On average, sixteen hundred traffic-related injuries occur in Cambodia per month with about 18% of those occurring in Phnom Penh alone. Approximately six traffic related fatalities occur per day. Traffic related accidents tend to increase during the Khmer New Year, Chinese New Year, and the Water Festival (times of increased traffic flow between cities)[2].

Currently, nine major hospitals and health clinics in Phnom Penh have agreed to participate in an information gathering study with Handicap International's "Road Traffic Accident and Victim Information System" (RTRAVIS). This partnership (between the Cambodian Red Cross and Handicap International Belgium) works towards continuously gathering information to create monthly summaries of road traffic related injuries in Phnom Penh. This program does not currently run in any other Cambodian province.

Motorbikes are the most popular form of transportation in Phnom Penh. Motorbike rental shops are a ubiquitous business in this bustling capital. No formal training is required to rent a vehicle. These two factors make it difficult to obtain an estimate of the number of motorbikes in circulation in the

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[1] National Institute of Statistics of Cambodia: http://www.nis.gov.kh/index.htm

[2] Cambodia Road Traffic Accident and Victim Information System: http://www.handicapinternational.be/

city. However, over 80% of the traumas documented by RTRAVIS in 2005 involved at least one motorbike driver[2].

In addition, while the city has defined regulations with respect to helmet use, only about 3% of motorbike trauma victims admitted to wearing a helmet regularly[2]. With no limit to the number of passengers (or indeed, large objects) that are carried per motorbike, a significant lack of adherence to standard traffic rules, and the variable quality of roads in the city--it is not surprising that motor vehicle collisions are a common event. These sobering statistics suggest that trauma care is an ideal area for study and improvement in the emergency medicine field.

Goals of this Collaboration:

1. Provide service in the Calmette Hospital Emergency Department as a resident in emergency medicine
2. Perform a qualitative needs assessment of the emergency department in Calmette Hospital
3. Introduce a trauma algorithm to facilitate communication between the ambulance team and the receiving emergency medical physician
4. Develop a formal elective experience for Canadian residents in Calmette Hospital

Method of Information Gathering:

Prior to working in Calmette Hospital, a literature search was performed using the key MeSH phrases "emergency medicine needs assessment", "global/international health" and "assessment tools". No formal emergency medicine assessment tools were unearthed. Therefore, based on prior work done by Retezar and Krym[3], a series of questions were generated in order to gather information regarding Calmette Hospital's policies regarding triage, trauma, and resuscitation[4]. While on site, the heads of anesthesia (Dr. Jean-Baptist Dufourq), intensive care (Dr. Chhouy Meng) and emergency services (Dr. Chhor Nareth) were interviewed regarding the policies of the hospital.

Results:

I) Background of Calmette Hospital

Calmette is a public hospital that is administered and funded by the French and Cambodian governments. It is a fee-for-service hospital that offers a second tier of care for those who are unable to pay. The hospital provides

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[2]

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[3] See Appendix A, "Needs Assessment Questions Romania"

[4] See Appendix B, "Triage, Trauma, and Resuscitation"

continuous and comprehensive health care services for the citizens of Phnom Penh (73%), surrounding provinces (17%), and to foreigners (10%)[5]. Calmette has outpatient clinics in specialty services ranging from obstetrics to endocrinology, in-patient medicine and surgery beds, and a staffed emergency room that is always available to assist patients. Since the emergency room is open twenty-four hours per day and seven days per week, Calmette receives many of the traumas that occur in the evenings and early mornings. Calmette, by the lively Lake Boeng Kak, is one of the main participating hospitals in the RTRAVIS study.

Calmette sees approximately fifteen thousand patients per year of which 20% are emergency visits. Trauma related injuries accounted for 47% of the emergency visits to Calmette in 2005. It was the most common reason for seeking emergency health care services last year. In addition, cranial trauma was the leading cause of mortality from the emergency department (accounting for 38% of the mortality rate)[5].

II) Pre-Hospital Emergency Medical Services

Calmette Hospital has two ambulances at its disposal. One ambulance is permanently placed in the field and is used primarily for blood transfusion services. The second ambulance is located at the hospital's emergency entrance and may be deployed whenever necessary. Two sets of health care workers (comprised of a driver, nurse, and/or doctor) rotate as the on-call pre-hospital response teams. Occasionally, a resident may replace one of the emergency doctors. Sometimes, a doctor may not be present in the ambulance. The hospital is currently understaffed and is actively trying to recruit two more doctors interested in staffing the ambulance teams.

The ambulance is equipped with a stretcher, intravenous capability, and limited medications. None of Calmette's healthcare workers are certified in basic life support/advanced cardiac life support/advanced trauma life support (or equivalent training). The physicians have some basic training in cardiopulmonary resuscitation but there is no formal system in place to respond to resuscitations and traumas.

About 40% of emergency patients reach the hospital via ambulance. It takes on average four hours to transport a patient to the emergency department[2]. This value takes into account patients being transported from Kandal province as well as from the outskirts of the city. However, many patients simply walk into the emergency department on foot or by the help of their relatives.

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[5] Sokha, Om. Systeme d'Information Medicale Rapport 2004, Royaume du Cambodge Minestere de Sante.

III) Organization of Calmette Hospital's Emergency Department

The emergency department consists of three main rooms: a) the main receiving room which has the capacity to house a maximum of twelve stretchers, b) a designated isolation unit for the evaluation of respiratory illnesses that may potentially accommodate four stretchers, and c) a holding assessment area for those patients who still require further monitoring or who are awaiting transfer to other consulting services. Of note, the beds in the respiratory isolation unit are not separated from each other. However, as a whole these four beds are separated from the main emergency department behind concrete walls and glass windows. Despite the high incidence of tuberculosis, the isolation unit does not have the capacity for negative pressurization.

One to two physicians run the emergency department in one of three eight-hour long shifts. Medical students, residents, and nursing students are typically present at the patient's bedside along with numerous members of the patient's family. Currently, there is a formal residency program in Cambodia for students interested in specializing in intensive care, anesthesia, and emergency medicine services. It is a four-year program undertaken after medical school. However, there are a few physicians who currently staff the emergency department without formal emergency medicine training.

Calmette Hospital does not have any formal triage system. Patients essentially arrive at the emergency department by the ambulance or by themselves and present to the department nurse. Patients are assigned a bed and await assessment by the doctor on call. At any one time, there may be from zero to twelve patients in the emergency department. Patient turnover is extremely quick, and every patient is within the view of the emergency physician.

IV) Trauma Equipment Available in the Emergency Department

Airway Materials:
-one laryngoscope set
-numerous endotracheal tubes (limited sizes)

Cervical Spine and Transport materials:
-5 soft cervical collars (not used routinely—only used if patient cannot move limbs)
-one hard board (for transporting patient from ambulance to stretcher)
-12 stretchers

Breathing Apparatus:
-2 ventilation machines
-numerous bag-valve masks
-numerous face masks with oxygen delivery capability

Circulation Apparatus:

-one crash cart
-1 defibrillator
-1 ECG machine
-2 blood pressure cuffs
-2 shared stethoscopes (but many doctors have their own)
-1 capillary pulseox monitor (shared)
-3-4 portable heart monitors
-numerous intravenous kits with crystalloid solutions
-1 phlebotomy kit

Discussion:

Working in a Cambodian emergency department presents many unique challenges to the Canadian emergency resident. Resources are not so abundant, clinical practices vary considerably, and communication can sometimes be very limited. It is tempting to try and apply Canadian style health care principles to the Cambodian health care system in the hopes of addressing perceived needs in this manner. However, this practice would be both inefficient and impractical. Health care goals for Calmette Hospital are different from the health care goals of a Canadian emergency department. Sometimes a simple intervention is all that is necessary to noticeably improve the existing system.

Calmette Hospital has a functional ambulance service, advanced imaging equipment (in the form of computed tomography and magnetic resonance imaging), and in-house neurosurgical capability. Yet despite these advantages, pre-hospital workers and emergency physicians often lack an organized approach towards assessing trauma and relaying the subsequent information to other team members. After performing a departmental needs assessment in consultation with the Chief of Emergency and various staff members, it was decided that the pre-hospital to hospital communication system would be an ideal area to target for improvement.

Currently, ambulance workers are required to fill out a one-page document regarding each patient transported to the emergency department through their services. For many different reasons, this information is almost never transmitted to the receiving emergency physician. This document is printed in Khmer and French, uses a size eight font, and is composed of fifteen different categories scattered in blocked out portions of various sizes on the report. Legibility is an issue. The document asks quite detailed medical questions that are not always known en route to the hospital. There is no area to clearly record basic information regarding the patient's stability en route. For example, the area for recording vital signs comprises a tiny corner at the bottom of the report. Oftentimes, this document is not filled out prior to arrival at the emergency department. Also of note, this report stays with the ambulance crew and does not join the patient's file in the emergency department. The verbal communication between the ambulance worker and

the receiving doctor constitute the majority of the handover between pre-hospital and hospital care.

Despite the significant proportion of traumas presenting to Calmette hospital, this pre-hospital ambulance document is not designed to record information regarding traumatic injuries. It attempts to record the details of a patient's generic medical history, but does not have a clear space for recording the salient details surrounding a patient's injuries on scene nor during transportation to the receiving hospital. This perceived need resulted in the formation of a trauma algorithm based on simplified advanced trauma life support protocol. The goal was to facilitate the assessment and transmission of information regarding a patient's condition immediately post-trauma.

Tool Developed:

See Figure 1: Calmette Hospital, Ambulance Information and Transfer Sheet

At the time of writing this report, Dr. Chhor Nareth was in the process of introducing this algorithm to his emergency medicine colleagues.

Future Research:

1. Evaluate the trauma algorithm tool
2. Head injury prevention measures
3. Evaluate post head trauma care and follow-up
4. Establish a formal working relationship between Calmette Hospital and the Division of Emergency Medicine at the University of Toronto
5. Establish a formal emergency medicine elective experience at Calmette

References:

1. National Institute of Statistics of Cambodia: http://www.nis.gov.kh/index.htm

2. Cambodia Road Traffic Accident and Victim Information System: http://www.handicapinternational.be/

3. Sokha, Om. Systeme d'Information Medicale Rapport 2004, Royaume du Cambodge Minestere de Sante.

See Figure 1: Calmette Hospital, Ambulance Information and Transfer Sheet

Calmette Hospital: Ambulance Information and Transfer Sheet

Date of Incident: **Location:**

Time of Incident: **Time of Call:**

Name: **Telephone:**

Age: **Gender:**

Ambulance Team:

Reason for Ambulance Call:

History:

Cervical-spine Control:
- o collar placed
- o collar unnecessary (NON-TRAUMA, OR LOW RISK)

Airway:
- o Open
- o Blocked

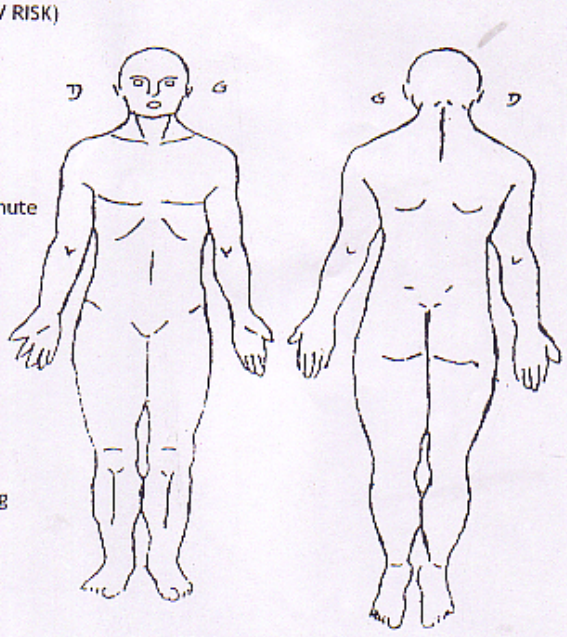
Breathing:
- o Breathing Spontaneously
  Respiratory Rate: _____ per minute

  Air Sounds are:
  - o Bilateral
  - o Unilateral:
    - o Right
    - o Left

- o Patient Not Breathing Spontaneously

Circulation:
- o Heart Rate: _____ per minute
- o Blood Pressure: _____/_____ mm Hg

Disability:
Level of Consciousness:
- o Alert
- o Opens eyes to verbal stimuli
- o Responds to Pain
- o No response



Circle Injury

Injury on Exposure: Check all that apply

	Head	Neck	Chest	Abdomen	Back	Pelvis	Other
Blunt							
Sharp							

Signature of Medical Doctor: _____

Appendix A: Needs Assessment Questions Romania

1. What hospital does the ED belong to?
2. What is the catchment area of the ED? / How many people do you serve?
3. How many patients do you treat yearly?
4. How big is your ED? How many beds does it have?
5. What are the ages seen?
6. Which are the most frequent conditions that are seen in the ED?
7. Are you a trauma center?
8. How many traumas do you receive per year?
9. Are there certain medical conditions that you have to transfer to a different institution?
10. What is the admission rate to the hospital from the ED?
11. What is the average waiting time before patients are seen by physicians?
12. What does the patient chart contain?
13. Is the final diagnosis clearly recorded?
14. Do you obtain any statistical data from the chart? If yes, what type of data do you obtain?
15. How many physicians work in the ED? Do you have residents rotating through the ED? What about medical students?
16. How many nurses work in the ED? Do they have EN training?
17. What is the EM training like for physicians?
18. How many residents and medical students rotate through the ED at one time?
19. Which of the following equipment do you have
    - procedure carts
    - ATLS/ACLS wall poster
    - Glasgow Coma Scale
20. Are medical texts/journals available to you?
21. Are all nurses and physicians certified in BLS/ACLS/ATLS?
22. What type of difficulties/concerns do you have in the ED?
23. What CME topics would you benefit from?
24. Do you have specific disaster medicine topics that you would like us to address?

Please e-mail us a document regarding the structure/description of ED/hospital.

Appendix B: Triage, Trauma, and Resuscitation

General Information

1. How many MDs in the ED?
A: 10 staff doctors, 2 per shift. Shifts go from 0730 hrs to 1930 hrs, 1930 hrs to 0100 hrs, 0100 hrs to 0730 hrs.

2. How many nurses?
A: 30 nursing staff in total. About 4 nurses per shift.

3. Do you have residents rotating through the ED?
A: Yes. Residents (i.e. Canadian equivalents) pursuing specialties have 1-3 mos rotations through the ED as part of their training. Medical students also rotate through here once a week. Interns (those pursuing a family medicine diploma) also rotate through the ED. In any one day, there are typically 2 residents, 1-3 interns, and the occasional senior medical student.

4. What is the EM training required?
Medical school lasts 6 years and begins after high school. Those who wish to pursue a general practice must complete a 2 year internship after the 6 years of medical school. Those who wish to specialize must write a test in the 6th year of medical training and then pursue 4 years more of study (the last year of which takes place in France). Current MDs who work in the ED were chosen based on experience and do not necessarily have this specific training. But the current crop of students who wish to become emergentologists must pursue a specialty in anesthesia/emergency/ICU.

5. Are medical texts available to you?
A: Yes, mainly in French with the occasional (bootleg) text in English. No Khmer textbooks
are routinely used.

6. What types of difficulties/concerns to you have in the ED?
-lack of resources
-sometimes the ED must take care of overflow patients (e.g. if the ICU for the indigent population is full, the patients are bounced back to the ED).

7. Please email us a document regarding the structure/description of the ED/hospital.

See the SIM report 2004

Triage

1. What hospital does the ED belong to?
A: Calmette Hospital, French administered, public hospital

2. Any affiliations with other hospitals?
A:

3. What is the catchment area of the ED?
A: Anyone from Phnom Penh may come to the hospital. The hospital also services transfers from the provinces as well as foreigners.

4. How many patients treated yearly?
A: In 2004, Calmette Hospital saw 15400 patients (this includes triage/porte-urgence, external consultations, and specialty consultations). Everyone who presents to the hospital for the first time (i.e. no appointments for external or specialty consultations) must first present to the ED. In general, approximately 35-40 patients are seen through the ED everyday. In 2004, 3372 people went through the ED.

5. How big is the ED?
A: The ED consists of:
i) Main department (about 15 m x 10 m)
-contains the doctor's work area, medicine cabinets, washing station, equipment
-12 stretchers can be mobilized in total but there is enough room for about 7-8 stretchers at
any one time)
ii) One isolation room off to the side (about 2 m x 10 m) for respiratory diseases
-contains 4 beds
-no negative pressure facilities
-can double as a mini ICU when the proper ICU is full
iii) Transition Room
-contains 4 beds
-used mainly for patients who need to be observed for awhile (e.g. drug OD)
iv) Storage Room (about 4 x 6 m)
-contains stock equipment

6. How are the beds divided?
A: Other than the isolation and transition room, there is no division of severity of disease in the main department.

7. What types of patients are seen?
A: Mainly adults are treated in this hospital. The average age of a patient presenting to the ED is 36. The ratio of M:F is 1.2. 75% are paying patients, 25% are indigent. 75% come from Phnom Penh, 11 % from Kandal, 17 % from the provinces, 10 % foreigners.

8. What are the most frequent conditions seen in the ED?

Top 2 presenting complaints (in decreasing order)

-trauma (20%) secondary to motorcycle accidents, and infectious diseases (14%) of which TB and HIV are commonest

NB. See SIM 2004 page 13 for percentages of these complaints and the rest of the top 10 causes of presentation.

9. How do you organize the urgency with which patients are seen?
A: There is no standard triage system per se. People either come in by ambulance or of their own accord and are ushered directly to the triage/ED. Usually a nurse will approach the patient first and take a set of vitals, but there is no division based on the acuity of the patients. An intubated person may be placed next to a person with an ankle sprain.

The MD is the person most responsible for deciding who gets seen first and this is both based on experience and availability. The ED does not hold patients for a long time (it acts very much more like an elaborate triage system) and patients commonly stay for less than 1 day. Once a patient's diagnosis is made, they go for confirmatory tests/imaging and are sent to the appropriate department (medicine or surgery departments for the paying and the indigent, or the ICU, or they remain in the ED). Consultants do not come to assess patients in the ED.

10. Who is responsible for triaging patients?
A: The MD is the most responsible. The Cambodians disagree with putting this decision making responsibility on a nurse. Nurses do not have advanced directives and must wait for a doctor's orders before proceeding.

11. What type of training for the triage person?
A: Staff MD (see below for emergency doctor training)

12. How does the triage staff interact with pre-hospital care workers?
A: Nothing standard. There are no formal notes written by ambulance staff. The ambulance arrives at an entrance about 5 m from the ED. The patient is transferred by either the ambulance staff or by their own family members.

13. What is the average waiting time before patients are seen by physicians?
A: Usually quite fast (usually the patient is seen immediately, sometimes the resident will see the patient first). From my observations, patients are usually seen within 10 minutes and faster if the patient is unstable. Because the patient comes in directly to the ED and because the ED moves people through quite quickly, there are very few steps before a patient is seen by a doctor (even registration comes afterwards when notes are made).

14. What does the patient chart contain (see sample from Dr. Nareth)
A: ID, CC, PMHx, ROS, Vitals, PE, impression, orders, lab tests and imaging ordered

15. Is diagnosis clearly recorded?
A: Yes.

16. Do you obtain any statistical data from the chart? If yes, what type of data do you obtain?
A: Data is used for SIM (annual collection of patient statistcs) and RTRAVIS (for traumas). I have copies of both these reports in French (for SIM) and English (for RTRAVIS). The SIM is for 2004 and contains many useful statistical information concerning the makeup of the population presenting to Calmette.

Trauma

1. Are you a trauma centre?
A: Yes. Calmette is open 24 hours, 7 d/week.

2. How many traumas do you receive per year?
A: In 2004, 20% of the patients presenting to the ED had a trauma related injury.

3. Is there a designated trauma team?
A: No

4. Are there designated trauma rooms?
A: No

5. Who attends the traumas?
A: Whoever wants to! The staff MD, 1-2 nurses, and usually a group of bystanders made up of interns, medical students, and family members. There are neither designated trauma team leaders nor trauma nurses.

6. Are there certain conditions that you have to transfer to another institution?
A: Micro-neurosurgery needs to be transferred but all other injuries can be managed in Calmette. Usually, people are transferred because of patient preference (to Bangkok).

7. What equipment is available in the ED?
-one crash cart (see picture of list of equipment within)
-1 defibrillator
-1 ECG machine
-2 BP cuffs
-2 shared stethoscopes (but many have their own)
-1 capillary pulseox monitor (shared)
-up to 12 stretchers
-numerous portable heart monitors
-numerous ETT kits
-one intubation tray
-5 soft cervical collars (not used routinely—only used if patient can not move limbs)

8. What medicines are available?
A: Medicines are located in two cabinets in the ED (see picture of list)

9. What imaging modalities are available?
-xray, U/S, CT and MRI

Patients are very quickly moved to the imaging test of choice and are tranferred by their relatives. People who can pay receive faster service. Those who cannot pay must first have their test approved by the hospital director before proceeding.

10. Do staff have ATLS training?
A: No, the examinations in general are not systematic. For example, one boy came in presenting with leg pain secondary to falling off his motorcycle bike after being hit by a car. There was no examination done of his head or neck. His femur was splinted and he was sent to xray. The staff MDs here seem to focus very closely on the presenting complaint and sometimes do not go through a personal history.

Resuscitation

1. Are there designated resuscitation rooms?
A: No

2. Access to essential medicines?
A: Will include a photo of the list of medications available in the department

3. Do staff have BLS/ACLS training?
A: No. But there is rudimentary informal teaching done in this area.

NB. I will take photos of the hospital, the ED, the list of medications in the ED, the list of contents in the crash cart, and will have copies of a standard chart available upon return.